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<p>Smoking is a modifiable behavior that is negatively related to women's health and physical readiness, and increases the burden on military health care systems. This behavior is of particular concern to the DoD because military women are more likely to smoke than their civilian counterparts and because women have greater difficulty quitting than do men. The present 2½-year study, funded by the Defense Women's Health Research Program (DWHRP), is testing innovative approaches to reduce smoking among Navy women by evaluating two different relapse-prevention interventions that support maintenance of the "quit status" organizationally mandated during basic training. Women smokers (n=3,036) were assigned to either a control group or one of two intervention groups at entry into basic training. One intervention group was encouraged to access a telephone helpline for counseling to remain a nonsmoker; the other group received a series of monthly mailings. Analyses of assessments at 3-, 6-, and 12-months post-graduation are being completed to evaluate the effectiveness of the interventions in maintaining the "cold turkey" smoking cessation induced during recruit training.</p>			
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FOREWORD

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Principal Investigator's Signature

July 1, 1998

Date

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Statement of Work

Year 3

Goals:

Complete data collection, intervention efforts, data processing and analyses; submit final report.

Tasks:

- A) Complete 12-month follow-up data collection. [month 4]

Collection of the final 12-month follow-up data was extended through the end of July, 1998. This extended data collection period was undertaken to increase the response rate to the final survey, and was made possible through implementation of a no-cost extension.

- B) Complete post-RTC relapse-prevention/cessation-support intervention efforts. [month 3 for mail and month 5 for helpline]

Completed. The mail intervention was completed in March, 1998; the helpline support ended in June, 1998.

- C) Complete data processing and analyses. [months 6-9]

The majority of data processing and analyses have been completed. Because of the extended 12-month follow-up data collection effort, final analyses will be conducted August 1998 through December 1998.

- D) Summarize results for final report and publications. [months 10-12]

Because of the extended 12-month follow-up data collection, the final report will be completed in January-February, 1999.

Milestones:

- A) Submit final report.

The final report will be submitted March, 1999, one month following the end of the no-cost extension of funding.

- B) Report study findings on the prevalence of women smokers at entry into the Navy in comparison with changes in self-reported smoking status after eight weeks in the "smoke free" recruit training environment, and at the 3-, 6-, and 12-month follow-up assessment.

See Results in the 1997 annual report and the Results section of this report. Additional analyses of intervention outcomes will be conducted after completion of the 12-month data collection.

- C) Report findings on the relative efficacy of the post-RTC 1-888-helpline versus mail support, and compare each to the effectiveness of exposure only to the Navy's standard policy and tobacco use cessation education in basic training.

See Results section of this report for interim results. Additional analyses of intervention outcomes will be conducted after completion of the 12-month data collection.

I. Introduction

A. Nature of the Problem

One of the primary goals of the Defense Women's Health Research Program (DWHRP) is to solve problems faced by servicewomen that will directly improve their safety, health, and military effectiveness. Facilitating nonsmoking among military women clearly fits within this DWHRP goal. Currently, smoking rates remain higher among military personnel than among civilians (Bray, Kroutil & Marsden, 1995; Bray, Kroutil, Wheless, Marsden, Bailey et al., 1995), underscoring the need for special efforts within the military to reduce this problem. Furthermore, research indicates that women have greater difficulty quitting smoking, and remaining quit, than do men. Thus, gender-specific interventions are needed that are effective in reducing tobacco use specifically among military women.

Tobacco use is an important issue when considering the factors that can influence military effectiveness/readiness. For example, smokers tend to exercise less and perform more poorly on military physical fitness tests (Conway & Cronan, 1992, 1988). This is a particularly important issue as military women prepare to go into job ratings previously unavailable to women, in large part because many of these jobs are very physically demanding. Thus, supporting healthful behaviors, discouraging unhealthful behaviors, and understanding the gender-specific factors that might support or inhibit such behaviors will become an even more important concern as women branch into virtually all domains of military operations.

The Department of Defense has recently become the largest employer in the US to mandate a total smoke-free workplace ban in which smoking is prohibited in virtually all indoor work spaces (DoD, 1994). This ban, although highly laudable from a health and readiness perspective, will place additional burdens (psychological, physiological, and temporal--i.e., time and location constraints for smoking) on military personnel who continue to smoke. Degradation of morale among smokers is also a concern. Consequently, it is to the military's advantage to support efforts that maintain the cessation state that is achieved by all military recruit smokers going through basic training in all four services. Estimating that over 30% of incoming military recruits are smokers, it is clear that the military's smoking prevalence would be dramatically lowered within a decade if a high percentage of incoming recruit smokers could *maintain* the "quit status" organizationally mandated during basic training.

B. Background and Previous Work

Recent civilian trends indicate that the prevalence of smoking and the burden of tobacco-related disease is shifting, as the smoking rates of young adult women are beginning to exceed those of men (Pirie, Murray & Luepker, 1991; Pierce, Fiore, Novotny et al., 1989; USDHHS, 1988; Remington, Forman, Gentry, et al., 1985.) Of particular concern to the DoD, a study comparing substance use in standardized samples of civilians and military personnel concluded that military women are more likely to smoke and to smoke heavier than their civilian counterparts (Bray, Marsden & Peterson, 1991; Bray et al., 1995). Another study reported a 50% smoking rate

among women entering the US Navy compared to a 41% rate for men (Pokorski, 1992). As the numbers and roles of women in the military expand, it is of critical importance to reduce their smoking prevalence and the smoking-related adverse effects on readiness, personal health, medical care costs, and the health of their children.

There have been reductions in military smoking rates in recent years due at least in part to military health promotion efforts, yet increased support for cessation is needed to further reduce smoking rates (Pokorski, 1992). Cessation is a complex behavioral problem for smokers, most of whom experience substantial difficulty quitting (Fiore et al., 1989). In general, however, smokers prefer to quit without intensive intervention. Convenient information and support in the form of telephone hotlines and mailed self-help materials have been shown to be effective (Gruder, Mermelstein, Kirkendol, et al. 1993; Ossip-Klein, Giovino, Megahed, et al. 1991). The issue of cessation is complicated, however, by the fact that women and men may have different cessation experiences. For example, women and men are similar in terms of their intentions to quit and their number of quit attempts, yet women are less likely to succeed in their cessation efforts (Kabat & Wynder, 1987; USDHHS, 1979; Gritz & Jarvik, 1978). Black women in particular have a low propensity to quit (Geronimus, Neider & Bound, 1993). Theoretical and empirically-based explanations for this finding point to gender differences in the following: severity of withdrawal symptoms (Guilford, 1967), confidence and self-efficacy for quitting (Blake, Klepp, Pechacek, et al., 1989), perceived social/psychological benefits of smoking (e.g., stress reduction) (Lacey, Manfredi, Balch, et al. 1993; Grunberg, Winders & Wewers, 1991), media and social influences to smoke (Grunberg, Winders & Wewers, 1991; Ernster, 1985; Howe, 1983), cognitive and emotional reactions to cessation lapses (O'Connell, 1990; Blake, Klepp, Pechacek, et al., 1989), normative biases regarding smoking prevalence (Lacey, Manfredi, Balch, et al., 1993), cessation coping strategies (Sorensen & Pechacek, 1987), occupational status and perceived control at work (Hibbard, 1993), knowledge and concern about the health risks of smoking (Sorensen & Pechacek, 1987; Ernster, 1985) and biological sensitivity to nicotine (Perkins, 1996; Grunberg, Winders & Wewers, 1991).

During cessation attempts, women may rely on informal sources of social support more than men do (Sorensen & Pechacek, 1987.) In addition, studies consistently report that women fear cessation-induced weight gain, and that this concern may contribute to relatively higher relapse among women (Marcus, Albrecht, Niaura, et al. 1991; Perkins, Epstein, & Paster, 1990.) Weight gain may be particularly worrisome for women in the military because their fitness level and weight are routinely tested, and unacceptable levels are grounds for discharge (OPNAVINST 6110.1D, 1990). The findings above suggest that smoking cessation interventions should be gender-specific, and that effective cessation programs should include convenient social support and weight management strategies (e.g., focus on exercise and nutrition) (Marcus, Albrecht, Niaura, et al., 1991; Sorensen & Pechacek, 1987.)

Comprehensive DoD and service-specific policies have been implemented that address the prevention and reduction of smoking by mandating smoke-free work places and cessation support for military personnel (DoD, 1994; SECNAVINST, 1986). The US Navy, for example, prohibits tobacco use during recruit training for the entire eight-week duration of basic training. A recent study by two of the this study's investigators found a meaningful impact of the Navy's

no-smoking policy on the smoking behavior of male recruits at graduation from basic training (40% self-reported quit rate) (Hurtado & Conway, 1996). However, because the 1-year quit rate indicated substantial relapse, the authors recommended cessation education and skills training to help new Navy personnel maintain long-term cessation. An unpublished study by the same investigators of male and female enlisted recruits found that the short-term positive effects of the smoking ban during basic training was more dramatic for women smokers than for men (i.e., a 43% reduction in smoking prevalence for women versus 15% reduction for men). However, women also showed greater relapse at the one-year follow-up (67% increase in smoking for women versus 38% increase for men).

C. Purpose of Present Work

The primary purpose of this study is to test an innovative approach aimed at reducing tobacco use among Navy women. The study, entitled Operation Stay Quit (OSQ), is designed to implement and evaluate two relatively “nonobtrusive” (i.e., telephone helpline and mail) relapse-prevention strategies supporting maintenance of the organizationally-enforced “quit status” achieved by all recruits during their basic training. In addition to a standard-treatment control group, one intervention group is encouraged to access a toll-free, telephone helpline for support and counseling to remain a nonsmoker or to quit again if they have relapsed into smoking; the other intervention group receives a series of monthly mailings to support and encourage nonsmoking during their first year of naval service.

1. Hypotheses

The investigators’ primary hypotheses regarding the smoking rates of Navy women during their first year of service are the following:

- (a) The prevalence of self-reported smoking among women recruits at entry into the Navy will decline significantly by the end of basic training as a result of exposure to the mandatory no-smoking policy and standard tobacco use education received during recruit training. This result has been observed previously in men recruits (Hurtado & Conway, 1996). And, based on a small sample of unpublished data on women by these investigators the percentage change from self-reported smokers to nonsmokers by the end of training is expected to be greater in women than previously reported for men.
- (b) The relative percentages of former smokers who *relapse into smoking* after leaving the Recruit Training Command will be ordered as follows:
 - (i) lowest relapse rate in the women assigned to the condition with access to and encouragement to use the telephone helpline,
 - (ii) intermediate relapse rate in the women assigned to the intervention condition receiving regular mail support, and
 - (iii) highest relapse rate in the standard-treatment group of women who receive no intervention supporting maintenance of smoking cessation after graduating from

recruit training. It is hypothesized that the telephone helpline group will have lower relapse rates than the mail-support group for several reasons. Although everyone in the mail-support group will receive intervention materials, this approach is a *passive* strategy and is, therefore, expected to have a lower impact than the *active* strategy involved in the telephone helpline approach. Also, whereas only a subset of individuals in the helpline group will actually use the phone service, it is expected that this intervention strategy will be very effective for those who do call. In addition, incentives will be offered to encourage use of the helpline.

- (c) "Stage-of-change" patterns of cessation and relapse curves are expected to be different across the groups based on comparisons of the 3-, 6-, and 12-month measures of smoking status after leaving recruit training. The steepest relapse curve post-RTC is expected in the standard-treatment control group. The flattest relapse curve is expected in the group who receives the telephone counseling.
- (d) Considering only the intervention group with access to the telephone helpline after leaving the RTC, women who call the telephone helpline will have a lower smoking relapse rate at the 12-month follow-up than will women who do not use the helpline.

2. Technical Objectives

The specific questions to be addressed by the primary technical objectives of this project are as follows:

- (a) After exposure to the RTC's 24-hour-per-day no-smoking policy (i.e., mandatory "cold turkey" cessation for eight weeks) do a significant number of women who smoked when they entered the Navy modify their self-concept as smokers and report that they are *former* smokers at the end of recruit training?
- (b) What percent of women smokers relapse into smoking again after having spent an 8-week period of mandatory cessation? Does this percentage vary by demographic subgroups (e.g., age, education, ethnicity), by psychosocial predictors (e.g., "stage of change" for smoking cessation), or by Navy environmental factors (e.g., ship versus shore command, deployment status, job rating, type of technical training)?
- (c) Are the two cessation-support interventions tested in this study more effective than the Navy's "standard treatment" in preventing smoking relapse after leaving recruit training? What is the relative effectiveness of the telephone helpline support compared to the mailed support in preventing smoking relapse?

II. Body

A. Methods

1. Study Setting

All Navy recruits - women and men - receive their basic training at the Recruit Training Command (RTC), Great Lakes, Illinois. The RTC was the setting for recruitment into the study, as well as baseline and graduation assessments of smoking status. All recruits go through an 8-week basic training program as their introduction to the Navy. A 24-hour-per-day ban on smoking is in place for the entire eight weeks of training. Following completion of recruit training, Navy personnel are stationed at commands throughout the world. Intervention materials and surveys were mailed to participants at their current duty station.

2. Participants

Study participants consisted of volunteers from among all female recruits entering the Navy between March 1996 and March 1997 (approximately 12 consecutive months). A recruitment period of approximately one year was chosen due to the seasonal variation in the characteristics of recruits. The 1997 annual report provides a detailed description of the participant sample.

3. Design

The research is a longitudinal field experiment in which women recruits were randomly assigned to one of three conditions and were followed over five repeated assessments. All women recruits were approached during processing week (P-week) regarding participation in the study. After being given a description of the study, they were asked to give voluntary consent to participate and complete a baseline survey. Just prior to graduation, these recruits were asked to complete a graduation survey to ascertain changes in self-concepts regarding smoking status. All recruits who described themselves as smokers on the baseline survey comprised the follow-up study group, which was assessed three additional times over the course of one year post-RTC training.

The three study conditions are:

- (a) **control** - standard recruit training information and no other treatment (RT-only),
- (b) **telephone** - standard recruit training plus access post-RTC to a toll-free telephone helpline to support relapse prevention or support for quitting again (RT + phone), and
- (c) **mail** - standard recruit training plus a series of post-RTC regular mailings with incentive items to support relapse prevention and encourage quit attempts (RT + mail).

Because all recruit training activities are conducted as divisions of approximately 80 women, random assignment to condition was made by division rather than individual. Thus, divisions were randomly assigned to one of the three study conditions: (a) RT-only, (b) RT + phone, and (c) RT + mail. Although the unit of randomization was division, the unit of all analyses is the individual. This is appropriate because individuals are essentially randomly assigned to divisions (i.e., in the order they arrive at recruit training).

Smoking relapse typically occurs relatively soon after a quit attempt, therefore several assessments of smoking status are made during the first year post-RTC. It has been estimated that approximately 70% of people relapse within three months of a cessation attempt, with an additional 10-15% relapsing between 3 and 12 months (O'Connell, 1990). Participants are sent a follow-up smoking status survey at 3-, 6-, and 12-months after graduating from recruit training.

4. Follow-up Tracking Procedures

The study has used several Navy data sources to locate and track study participants after graduation from RTC. For the purpose of conducting the 3-month post-graduation smoking survey, the orders-disseminating computer system maintained by Source Data Systems (SDS) at Navy Bureau of Personnel (BUPERS) provided the basis for tracking participating recruits immediately after graduating from recruit training up. SDS electronically sent OSQ staff a weekly file of all women recruits receiving orders that week for their post-graduation assignment. SDS files were found to furnish reliable information about a recruit's whereabouts up to three months post-graduation. In cases where participants had graduated from RTC but did not appear in SDS files, the Navy's standard personnel file, the Enlisted Master Record (EMR), was checked to determine the status of the participant. The EMR resides on the Naval Health Research Center (NHRC) VAX computer, and was accessed electronically each month and information downloaded to the OSQ main computer. Information about a recruit's present and future command location, along with demographic data, was extracted from the 390-character EMR. In addition, the EMR contained "loss dates" that were used to identify Navy drop-outs/attritors. As a last resort, a hired staff person on-site at RTC could access other specialized Navy databases (i.e., Navy locator file, RTC databases) to identify location and status of the participant. All of these data sources, except SDS, are used to track participants for the 6-and 12-month surveys as well. No fewer than two attempts were made to deliver the surveys to "smokers" using a combination of these sources of information.

5. Survey Procedures

Entry Survey Procedures. On P4-day (i.e., fourth day of processing in the training cycle), all female recruits went through the "Wellness Clinic." At this time women received a gynecological exam and were given information in lecture format on several areas of health promotion, including pregnancy and birth control, sexually-transmitted

diseases, and substance abuse (including drugs, alcohol, and tobacco). Prior to being given any health information, the OSQ study was introduced and informed consent procedures were systematically conducted using a 10-minute videotaped presentation. Recruits who volunteered to participate in the study were asked to complete a brief one-page "Entry Survey" related to their tobacco use *prior* to entering the Navy.

Graduation Survey Procedures. During the week prior to graduation from recruit training (typically on Week 7-3 day), recruits attended a "Recruit Critique" session during which they provided anonymous feedback by questionnaire or written comments regarding their training. After completing their feedback, any male recruits (if present) were dismissed to muster outside while female recruits remained approximately 15 minutes longer. During this time an OSQ staff member reminded recruits about the study and asked volunteers to complete a brief one-page "Graduation Survey". The "Grad Survey" asked several questions about tobacco use that were similar to those on the "Entry Survey" (e.g., description of self as a smoker or nonsmoker, intentions to smoke) so that changes during the 8-week period of mandatory smoking cessation could be assessed.

Follow-up Survey Procedures. All female recruits who reported on the entry survey that they had *any experience with smoking* (referred to in the present report as "smokers") comprised the follow-up study group. These "smokers" included those who identified themselves as daily smokers, occasional smokers, experimenters, or former smokers. The rationale for the inclusive, liberal definition of "smokers" was based on previous studies of Navy personnel that suggest some new service members may take up the habit once joining the Navy, or may relapse if they had been a former smoker (e.g., Cronan, Conway, & Kaszas, 1991; Bray et al., 1991). It was believed that former smokers at entry, and those who had even experimented with smoking, might be at risk for becoming regular smokers once joining the Navy. Thus, daily smokers as well as those that occasionally smoked, experimented with smoking, and former smokers were targeted for post-RTC intervention and follow-up.

After graduating from recruit training, all participants are sent a 3-month, 6-month and 12-month follow-up survey. The content of the three surveys is identical, and the surveys are color-coded to indicate the assessment time point. Follow-up measures primarily address smoking status and quit attempts. Many items on the follow-up surveys provide the reference point "since graduating from recruit training" so that patterns of relapse and quitting can be determined.

A number of strategies are used to maximize the response rates to the follow-up surveys. A monetary incentive is offered with each survey (i.e., a chance to win \$100.00) for returning completed surveys. The following week, a postcard is sent reminding participants to return their survey for a chance to win \$100.00. If a survey has not been returned within 2 weeks after the initial mailing, trained phone surveyors attempted to contact the nonrespondent by telephone to conduct an abbreviated version of the survey. Phone surveyors were given two weeks to contact and complete any given survey.

Finally six weeks after mailing the original survey, a brief postage-paid "postcard" version of the survey with a few critical items is mailed to nonrespondents. Once again, a chance at winning \$100.00 was offered for completing the "postcard" survey.

For the 12-month follow-up survey, a number of additional procedures were implemented to increase the response rate to this final survey. With the first mailing of the 12-month survey, participants are offered a free pre-paid phone card valid for 10 minutes of long distance phone calls in addition to entering the \$100.00 lottery if they complete and return the survey. Those who do not return the survey from the first mailing are contacted by phone, as detailed above. Following the phone survey attempts, those who still have not responded are sent a second 12-month survey with an offer of \$20.00 cash for completing and returning the survey. Participants who do not respond to any of these survey attempts are sent a postage-paid, brief survey postcard. Lastly, nonrespondents are mailed a postcard asking them to call one of two phone numbers *collect* to complete a survey and receive \$20.00.

6. Description of Interventions

Two intervention strategies are employed in this study. One intervention group is encouraged to call a toll-free telephone helpline for support and counseling on how to remain a nonsmoker or how to quit again if relapse has occurred. This is considered an *active* intervention in that it is initiated by the participant. The second intervention group receives a series of regular motivational mailings to support and encourage nonsmoking during the first year of naval service. This is considered a *passive* intervention in that no action is required by the participant.

Both relapse prevention interventions use a cognitive-behavioral approach that assumes behavioral changes such as quitting smoking are primarily due to self-regulation and motivation (Marlatt & Gordon, 1985; Baumeister, Heatherton & Tice, 1994). The interventions address issues specific to women and cessation, and are based on empirical findings on gender differences in smoking cessation (Gritz, Brooks & Nielsen, 1995). Finally, both interventions are designed to address issues relevant to Navy life and utilize strategies for quitting and remaining smokefree that are Navy-specific.

Mail Intervention Materials Development and Procedures. Subjects assigned to the mail intervention condition receive a series of six mailings beginning one month post-graduation and continuing for a period of 10 months. The mailings consist of a colorful, one-page motivational flyer accompanied by a small "behavioral cue" item. The intervention modules are mailed out once per month for the first four months post-RTC, then every three months for the remainder of the 10-month period. Copies of the mail support intervention modules can be found in the 1996 annual report.

Phone Intervention and Procedures. The telephone helpline is an innovative approach to smoking relapse prevention. Women assigned to this condition receive information regarding the 1-888-helpline services prior to leaving recruit training, and are encouraged

to call the number upon leaving recruit training. Incentives such as a pre-paid long distance phone card are offered to encourage phone calls. Once the participant makes the initial call, the helpline counselor schedules a series of follow-up phone calls, thus creating a proactive counseling procedure. This procedure creates a certain level of accountability, as well as fostering social support. The follow-up sessions are scheduled in relation to the participant's probability of relapse, thereby providing assistance when they need it most (Zhu & Pierce, 1995).

The counseling protocol has been adapted to reflect the relapse issues most relevant to Navy women, as discussed above. In particular, the phone counselor helps the caller identify situations in which she feels she is most likely to relapse and works with her to identify responses/alternative actions to take to reduce the likelihood of relapse. In subsequent phone calls, the counselor discusses any relapse episodes and works with the caller to identify better ways to respond in situations that prompt smoking. Alternatively, if the caller has remained quit, subsequent phone calls are used to encourage the success and identify long-term strategies for remaining quit.

7. Measures

All Surveys. Primary measures for evaluating intervention effects include self-report survey measures of smoking status, smoking frequency and amount, quit attempts, and stage of change for cessation. Investigators from SDSU, UCSD, and NHRC developed smoking measures for this unique population in part based upon those used by other researchers examining smoking and cessation among Navy and civilian personnel (Bray, Marsden, & Peterson, 1991; Bray, Kroutil, Wheless et al., 1995; Hurtado & Conway, 1996; Conway, Trent, & Conway, 1989; Farkas, Pierce, Zhu, Rosbrook, Gilpin & Berry, 1996). Where possible, comparability with other surveys, such as the DoD worldwide survey of drug use (Bray et al., 1995) and the California statewide tobacco use survey (Pierce et al., 1994), was maintained.

Three brief, color-coded machine-scannable surveys were developed to assess smoking at five different points: RTC entry, RTC graduation, 3-month, 6-month, and 12-month post-graduation. The entry survey includes the consent form, and all the surveys include some personal identifiers, items addressing cigarette, and other correlates of smoking. In addition, questions about quit and intentions to smoke in the future are included (see 1996 Annual Report for copies of all surveys).

UCSD Data Collection. The counseling protocol developed by UCSD telephone counselors for subjects in the helpline condition. Data collected during the call included background and identifying information, smoking status, self-efficacy and motivation to quit smoking, quitting history, reasons to quit smoking, social support and social influences to smoke and quit, and general health status (e.g., pregnancy). In addition, quantitative data were collected about situations the subject had encountered (or anticipated encountering) that may lead to relapse.

EMR Demographics. As mentioned above, the EMR provides important variables for tracking research participants over the course of the study. Tracking variables include current, previous, and future UICs (i.e., commands), dates of transfer to and from UICs, loss codes, sea versus shore status, and regular versus reserve status. In addition to tracking variables, the EMR also provides sociodemographic and command-related information that will be examined as mediators and moderators of intervention effects. These potential mediators and moderators include age (i.e., birthdate), race/ethnic group, rating, paygrade, Navy enlisted classification (NEC), years of education, marital status, number of children, Navy performance and evaluation information, and command size.

8. Analyses

Analyses have included descriptive procedures, such as frequency distributions and chi-square analyses of categorical variables. These analyses have been conducted to determine participation rates and examine entry smoking rates of incoming recruits. Chi-square analyses have been conducted to assess correlates of smoking at entry. Tests for differences in proportions have been used to compare recruit and civilian smoking rates. Analyses of entry-to-graduation changes in perceptions of being a smoker and intentions to smoke have included McNemar tests for correlated proportions and paired t-tests. Preliminary assessment of intervention results at the 3, and 6, and 12-month follow-up have been conducted using chi-square analyses.

B. Results

1. Participation in Intervention and Assessment

Between March 1996 and March 1997, 5,503 women within 87 divisions provided consent and completed entry surveys—93% of those eligible based on counts of recruits provided by RTC rosters. Refusals to provide consent and complete the entry survey were virtually nonexistent, and most of the 7% of women not completing surveys failed to because of scheduling changes that resulted in their not attending the Wellness Clinic with their division. Near the time of graduation, 4,411 women completed graduation surveys. Of those who completed entry surveys, 350 women were discharged from the Navy before graduating from recruit training. As these women were ineligible to complete graduation surveys, the response rate for the graduation survey was 86%. Again, virtually all of the 14% not completing a graduation survey failed to do so because they were completing other tasks and were not with their division.

All participants who reported having any smoking experience at entry to recruit training were targeted for follow-up at 3, 6, and 12-months after leaving recruit training. The 3-month follow-up data collection was completed in late summer, 1997. The final response rate to the 3-month follow-up survey was 39%. A manuscript is under review that describes the process and results of efforts to enhance response rates to the 3-month survey (see Appendix A).

The 6-month follow-up was completed in December, 1997. Of the 2,384 participants thought to be eligible for surveying, 41.4% (n=988) returned a 6-month survey. The 12-month follow-up data collection has been extended, and is currently being completed. Intensive efforts to maximize response rates have been conducted and to date, the response rate is 51.5%.

2. Extent of Intervention Delivery

Mail Support. As of March, 1998, all six modules of the mail intervention had been mailed to participants assigned to that experimental condition (approximately 1,000). When needed, two attempts were made to deliver successfully all intervention mailings, and the outcome of attempts was recorded (i.e., delivered at first attempt, delivered at second attempt, not deliverable). The rate of undeliverable mail was low, approximately 3%.

Telephone Helpline. In June, 1998, the helpline support intervention ended. As of that date, 29 participants had contacted the 1-888 telephone helpline. Out of these, only 5 completed the full counseling protocol.

3. Preliminary Assessment of Interventions Effects

Our last annual report provided a substantial number of analyses, including (a) the prevalence of smoking and cessation experiences among young women entering the US Navy, (b) a comparison of standardized Navy and civilian smoking rates, (c) correlates of smoking at entry into the Navy, (c) entry-to-graduation changes in perceptions of being a smoker, (d) correlates of changes in perceptions of being a smoker, (e) changes in intentions to smoke after leaving recruit training, (f) correlates of changes in intentions to smoke, (g) recruits' perceptions of the no-smoking policy at recruit training command, and (h) overall (i.e., across condition) smoking rates at the 3-month follow-up. These analyses have been, or currently are, being prepared as manuscripts to submit to scientific journals.

Intervention results, in terms of smoking prevalence at the 3-, 6-, and 12-month follow-up, are shown below. It is important to note that at the 3-month follow-up, the mail support intervention group had received only two mailings by the time of the survey. In addition, not all of the 12-month survey data are included in this analysis because these data are still being collected. As shown in the table, intervention efforts did not have a significant effect on smoking relapse. However, only past 30-day smoking prevalence is shown below. Additional outcomes such as amount of smoking, number of quit attempts, and stage of change toward cessation will be analyzed soon and are expected to be more sensitive measures of intervention effectiveness. In addition, important moderators/mediators of intervention effects (e.g., baseline level of addiction, race/ethnicity) will be explored.

Follow-up Assessment	<u>Past 30-day Smoking Prevalence</u>			χ^2	p
	Control Group	Mail Group	Helpline Group		
3-month (n=1064)	71	69	64	4.79	0.09
6-month (n=988)	63	61	64	0.74	0.69
12-month (n=755)*	56	58	58	0.51	0.77

*partial data

Sufficient funds remained in the project's budget to implement a no-cost extension through February 28, 1999 (modification P80002 of grant agreement no. DAMD17-95-1-5075). This extension was needed to conduct the expanded data collection efforts to boost the response rate to the 12-month follow-up survey. In addition, more in-depth data analysis will be conducted to evaluate intervention effects. Manuscript preparation and publication will be a priority during this extension period.

4. Publications, Presentations and Awards (cumulative)

Manuscripts

1. **Invited Editorial** (Terry L. Conway, PhD) to be published in the Fall 1998 issue of *Tobacco Control*, entitled "Tobacco use in the US military: A longstanding problem."
2. A manuscript entitled "Does the US Navy attract young women who smoke?" is under review with *Occupational and Environmental Medicine*. See Appendix A for a copy of the manuscript.
3. A manuscript entitled "Enhancing response rates to a smoking survey for enlisted US Navy women" is under review with *Evaluation Review*. See Appendix A for a copy of the manuscript.
4. Five manuscripts are currently in preparation. Three others will be written upon completion of the 12-month data collection and cleaning.

5. **The Health Psychologist, Spring 1996.** Operation Stay Quit was invited to submit an article regarding our research with Navy women. "Operation Stay Quit: Smoking relapse prevention for Navy women recruits" appears in the Spring 1996 edition (see the 1996 Annual Report for a copy of the article).
6. **Navy-wide Medical Press Release.** A press release describing the project and its overall goals was distributed through Navy MEDNEWS (see the 1996 Annual Report for a copy of the press release).

Presentations

1. **1998 American Public Health Association Annual Meeting.** An abstract entitled "Operation Stay Quit: A mail intervention to prevent smoking relapse among Navy women recruits" was accepted and will be presented in November, 1998, at the APHA annual meeting in Washington, DC. See Appendix B for a copy of the abstract.
2. **San Diego Biostatistics and Epidemiology Research Exchange, 1997.** An abstract entitled "Smoking in US Navy women recruits: sociodemographic correlates and comparisons with civilian women" was presented at this annual conference.
3. Recruit Training Command, Great Lakes, Briefing 7/9/97.
4. **1996 American Public Health Association Annual Meeting.** An abstract entitled "Effect of an 8-week involuntary smoking ban on women's perceptions of being a smoker" was presented at the APHA annual meeting in New York, NY.

Thesis/Dissertation

1. *Doctoral Dissertation.* In June, 1998, a Ph.D in epidemiology was awarded to Susan Woodruff (Operation Stay Quit co-investigator). The dissertation was entitled "The epidemiology of smoking among US Navy women recruits: Prevalence, correlates and short-term effects of involuntary cessation."
2. *Master's Thesis.* In May, 1997, the M.P.H. degree in epidemiology was awarded to Kathleen Weaver (Operation Stay Quit graduate assistant). Ms. Weaver's master's thesis was entitled "Smoking in U.S. Navy women recruits: Sociodemographic correlates and comparisons with civilian women."

Awards

1. *Augmentation Award for Science and Engineering Research Training (AASERT)*. Operation Stay Quit was granted an AASERT award in the amount of \$71,392 for a 2.5 year period. This award is supporting the work and professional development of one graduate-level research assistant.

III. Conclusions/Discussion

A. Findings

Our last annual report provided findings related to a number of research questions, including (a) the prevalence of smoking and cessation experiences among young women entering the US Navy, (b) a comparison of standardized Navy and civilian smoking rates, (c) correlates of smoking at entry into the Navy, (c) entry-to-graduation changes in perceptions of being a smoker, (d) correlates of changes in perceptions of being a smoker, (e) changes in intentions to smoke after leaving recruit training, (f) correlates of changes in intentions to smoke, (g) recruits' perceptions of the no-smoking policy at recruit training command, and (h) overall (i.e., across condition) smoking rates at the 3-month follow-up. These analyses have been summarized and have already been, or are close to being submitted to scientific journals.

The present annual report provides preliminary results of intervention effectiveness. Intervention efforts did not have a significant effect on relapse. However, additional outcomes such as amount of smoking, number of quit attempts, and stage of change toward cessation will be analyzed soon and are expected to be more sensitive measures of intervention effectiveness. In addition, important moderators/mediators of intervention effects (e.g., baseline level of addiction, race/ethnicity) will be explored.

B. Accomplishments and Challenges

Progress executing this study during its third year has continued to be outstanding. A primary concern earlier in the study had to do with relatively low response rates to the post-RTC follow-up surveys. To increase the response rates to the final 12-month follow-up survey, several additional procedures were instituted. A brightly colored flyer announcing previous winners of the \$100 lottery prize is now included with all follow-up surveys. Reminder postcards to return completed surveys for a chance to win the monthly \$100 lottery are sent to all participants several days after the surveys are sent. If a participant does not return her survey within two weeks, a trained phone surveyor attempts to contact the participant and complete the survey over the telephone. If phone contact is not successful, an abbreviated "postcard" version of the survey is sent to try to get answers to a few critical smoking questions. At the final 12-month follow-up, several additional procedures have been added, including offering a free pre-paid phone card and a \$20 cash incentive to complete the survey. Lastly, one additional postcard is sent requesting that a nonrespondent call collect to complete the final survey by phone. These added procedures

appear to have substantially increased the response rate at the 12-month follow-up (51.5% response rate to date).

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V. Appendices

A. Manuscripts - under review

B. Abstract – APHA 1998

Appendix A

Manuscripts (under review)

Does the U.S. Navy Attract Young Women Who Smoke?

Kathleen B. Weaver, MPH,¹ Susan I. Woodruff, PhD,^{1,2} Terry L. Conway, PhD,^{1,3}

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Running head: Smoking among Navy Women Recruits

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Text: 1,415

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Abstract

Objective. The purpose of this study was to assess whether the U.S. Navy is disproportionately attracting and recruiting female smokers from the civilian sector.

Methods. Standardized comparisons of cigarette use among Navy women recruits and civilian women were conducted with data from a 1996-97 Department of Defense study and the 1994 National Health Interview Survey.

Results. Young Navy women recruits (18-22 years of age) had significantly higher rates of current and heavy smoking than their civilian counterparts after adjusting for differences in sociodemographic characteristics. Smoking rates among older recruits and civilian women (23-30 years) were not significantly different.

Conclusions. It appears that the Navy attracts young civilian women who already smoke, many of whom smoke heavily.

Does the U.S. Navy Attract Young Women Who Smoke?

The civilian population has seen dramatic decreases in smoking rates in the last 30 years.[1,2] Although this decreasing trend has also been evident in the U.S. military, smoking rates remain higher among military personnel than among civilians.[3,4] Tobacco use is of particular concern to the U.S. Navy as it is estimated that 35% of Navy personnel are smokers compared to 25% of civilians.[1,4] Studies in the 1980s suggested that the military was creating smokers rather than attracting them, and that military policies and programs at the time had not been effective in reducing smoking.[5,7] The present study addresses the latter part of the “creating versus attracting” question and focuses on women just entering the U.S. Navy. No studies to date have been conducted that focus exclusively on military women, and no studies have compared smoking rates among new military *recruits* and civilians. This paper reports the results of standardized comparisons of cigarette use among U.S. Navy women recruits and their general population counterparts. By conducting standardized comparisons, the question of whether the Navy recruits female smokers can be answered more definitively.

METHODS

Data Sources

Navy Women Recruits. This study was part of a larger project sponsored by the Department of Defense to assess the long-term effectiveness of two smoking relapse prevention strategies for Navy women.[8] Data for Navy women recruits were taken from baseline surveys on tobacco use administered to all women entering basic training at the U.S. Navy Recruit Training Command at Great Lakes, Illinois during March 1996 to March 1997. Sociodemographic data were extracted from the computerized Navy Enlisted Master Record

(EMR). The EMR is maintained by the Bureau of Naval Personnel and is used in processing personnel information for all active duty Navy enlisted members.

Of the 5,894 Navy women recruits eligible for participation in the study, a total of 5,503 (93%) completed a baseline survey. Baseline surveys were matched with sociodemographic data from the EMR by social security number. Twenty-four surveys could not be matched. In addition, women who were age 17 upon entry into recruit training (n=325) were excluded from the present analysis due to incomparability with the female civilian population data. Women who were over the age of 30 were excluded because of their few numbers (n=73). Thus, 5,081 surveys (92% of the original surveys) were available for analysis.

Civilian Women. Civilian data were extracted from the 1994 National Health Interview Survey (NHIS). The NHIS collects health-related information on a yearly basis via face-to-face interviews with a sample from the civilian non-institutionalized population residing in the U.S. The Year 2000 Objectives Supplement to the NHIS was administered to one adult person per family in half of the households in the 1994 sample, and contains questions about tobacco use. A basic weight was applied which reflects the probability of selection and household nonresponse, resulting in national estimates of smoking. The Year 2000 Objectives Supplement includes a total of 19,738 interviews for a response rate of 79.5%. Sociodemographic and cigarette use variables for all females between the ages of 18 and 30 were extracted from the NHIS, for a total of 2,536 cases.[9]

Standardization Procedures

Direct standardization was used to adjust for sociodemographic differences between the two populations.[10] Civilian data were standardized to the joint distribution in the Navy women

recruit population of race/ethnicity (White, Black, Hispanic, other) and education (less than high school, high school, more than high school).

The DESCRIPT procedure in SUDAAN [11] was used to handle the complex NHIS sampling design and to produce standardized estimates and standard errors for the civilian data. Unstandardized estimates for Navy women recruits were compared with unstandardized and standardized estimates for the civilian women using a difference of proportions z test.[12] Comparisons are reported within three age strata: 18-19, 20-22, and 23-30 years of age. These age groupings were chosen to represent older teens, women in their early 20s, and what would be considered relatively “older women” in the context of the military recruit population. Because there were few women recruits in their mid- to late twenties, it was not possible to look at finer age groupings.

Measures of Cigarette Use

Navy and civilian women were categorized as smokers based on identical survey items. Those who reported smoking 100 cigarettes in their entire life and smoking in the past 30 days were classified as current smokers.[4] Current smokers who reported smoking 16 or more cigarettes per day were classified as heavy smokers.

RESULTS

As shown in Table 1, the Navy recruit population is younger, less educated, and somewhat more ethnically diverse, with larger percentages of African American and Hispanic women than the civilian population.

Insert Table 1 about here

Results of the comparisons of current and heavy smoking between Navy women recruits and civilian women are presented in Table 2. Standardized comparisons for women 18-19 years old and those 20-22 years old were statistically significant, with Navy women recruits having higher prevalences of current and heavy smoking in both of these age strata. For women 23-30 years old, Navy-civilian differences in current and heavy smoking were not statistically significant.

Insert Table 2 about here

DISCUSSION

This report provides evidence that the U.S. Navy disproportionately recruits more young women who already smoke prior to entering military service. This is especially apparent among young women (ages 18-22). Even after controlling for race/ethnicity and education, young Navy women recruits had significantly higher smoking rates than their civilian counterparts. Among older women (ages 23-30), there was no statistically significant difference in current or heavy smoking prevalence between the two populations after adjusting for sociodemographic factors.

Two limitations of the present study should be noted. First, data for Navy women recruits were collected in 1996-1997, whereas the data for civilian women were collected in 1994. However, assuming that smoking rates among women have continued to show the gradual

decline observed prior to 1994,[13] the results of this study are conservative (i.e., the 1996-97 civilian smoking rates might actually be slightly lower than the 1994 rates used in these analyses). A second limitation is that these data sets were collected using different methods of survey administration: the Navy recruit data were collected using self-report questionnaires whereas the civilian data were collected in face-to-face interviews. These differences suggest caution in drawing conclusions from the present study.

Results from the present study indicate that the Navy is dealing with a population of women who have high smoking rates from the outset of military service. Why the Navy may attract young smokers is not clear. Certain personality factors (e.g., sensation-seeking, risk-taking, rebelliousness, confidence) may play a role. There may be geographical differences such that women who come from regions with high smoking rates may join the Navy in disproportionate numbers. Unmeasured peer and parental factors (e.g., veteran status of father) also may influence a young woman to smoke and to choose to join the Navy. Whatever the explanatory factors, however, this finding underscores the need for intensified programs directed toward smoking cessation during the recruit training period. Perhaps more importantly, there is a need to create expectations among potential recruits that the Navy environment is non-smoker friendly. In 1987, the U.S. Navy instituted a 24-hour smoking ban during the entire 8-week period of recruit training, and in 1994 the Navy became a smoke-free workplace. These are important steps toward changing the Navy environment, which has historically tolerated (and perhaps promoted) smoking. However, more interventions are needed to change other aspects of Navy "culture" that may foster cigarette use. The military has a unique opportunity to make a positive impact by reducing cigarette use among its recruits and personnel. Most people who

enter the military return to the civilian sector after a relatively brief period of service. Thus, decreasing smoking rates among service personnel would reduce health-related costs not only for the military, but ultimately for the civilian sector as well.

Acknowledgments

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Table 1. - Sociodemographic Characteristics of Navy Women Recruits and Civilian Women, Age 18-30

Sociodemographic Characteristic	Civilian (n=2,536), %	Navy (n=5,081), %
Age		
18-19	11.1	62.1
20-22	19.2	26.5
23-30	69.7	11.4
Race/Ethnicity		
White, non-Hispanic	67.0	58.2
Black, non-Hispanic	16.5	23.2
Hispanic	11.8	12.3
Other	4.7	6.3
Education		
Less than high school	15.9	5.4
High school	38.0	85.3
More than high school	46.0	9.4

Note: Civilian percentages are based on cases from the 1994 National Health Interview Survey weighted to account for the probability of selection and household nonresponse.

Table 2. - Comparisons of Current and Heavy Smoking among Navy Women Recruits and Civilian Women by Age Group

Age Group	Current Smoking				Heavy Smoking					
	Navy	Civilian	Difference	95% CI	p	Navy	Civilian	Difference	95% CI	
<u>18 - 19 years</u>										
% Yes	35.5	16.7	18.8	14.2, 23.6	$\leq .001$	13.2	5.5	7.7	4.8, 10.6	$\leq .001$
Standard Error	0.9	2.5				0.6	1.6			
<u>n</u>	3148	277				3145	277			
<u>20 - 22 years</u>										
% Yes	40.9	29.5	11.4	6.5, 16.3	$\leq .001$	17.9	8.3	9.6	6.4, 12.8	$\leq .001$
Standard Error	1.3	2.8				1.0	2.0			
<u>n</u>	1343	474				1340	474			
<u>23 - 30 years</u>										
% Yes	32.8	34.7	1.9	-2.5, 6.3	ns	14.5	11.1	3.4	0.2, 6.6	ns
Standard Error	2.0	1.7				1.5	1.1			
<u>n</u>	576	1725				574	1723			

Note: Civilian estimates have been standardized to the Navy distribution of education and race/ethnicity.

Civilian Data Source: 1994 National Health Interview Survey

ns = not significant

Enhancing Response Rates to a Smoking Survey for Enlisted US Navy Women

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Abstract

This study examined the effectiveness of a stepped approach for increasing response rates to a mailed follow-up smoking survey among newly enlisted women in the Navy. The effect of the stepped approach on response rates and on the characteristics of respondents was evaluated. Also, costs were estimated for each of the steps to determine their relative benefits. Results showed that the stepped approach was effective in more than doubling the survey response rate among smokers. Reluctant respondents did not differ from on-time respondents in terms of demographics or baseline smoking, although nonrespondents were less educated and heavier smokers than on-time and reluctant respondents. Strategies documented here could well apply to survey efforts with other hard-to-reach populations.

Enhancing Response Rates to a Smoking Survey for Enlisted US Navy Women

Mailed surveys, frequently used to evaluate the effects of various programs and interventions, are convenient and tend to be less expensive to conduct than either telephone or in-person surveys (Perneger, Etter, & Rougemont, 1993). However, a primary problem with using mailed surveys is the typically low response rate of participants and differential response among particular groups of people (Fox, Crask, & Kim, 1988; Tambor, Chase, Faden, Geller, Hofman & Holtzman, 1993). Nonresponse presents potential biases that can limit the generalizability and threaten the validity of survey results (Kristal, White, Davis, Corycell, Raghunathan, Kinne, & Lin, 1993). Nonresponse to *health* surveys is typically associated with lower socioeconomic status, young age, male sex, minority status, and health-risk behaviors (e.g., smoking) (Armstrong, White & Saracci, 1992). Similarly within the military, response rates to surveys may be substantially lower among young, enlisted personnel who are in the lower ranks [Personal Communication, Naval Health Research Center, 1997].

If results of mailed surveys are to be reliable and useful, it is critical to implement strategies that will generate the highest response rates possible and capture a representative sample of respondents. Numerous studies have tested different methods for increasing mailed survey response rates. For example, studies examining the impact of a monetary incentive or the promise of a monetary incentive on response rates found that this type of incentive produces a significantly higher response rate than any other type of incentive alone (Perneger, Etter & Rougemont, 1993; Hopkins, 1992). Other studies have found that the use of postage stamps rather than business reply postage significantly improves response rates (Urban, Anderson, Tseng, 1993; Armstrong & Lusk, 1987). Still other studies have examined the effects of

telephone calling efforts, leaving messages on telephone answering machines, and combining a personal phone call with a letter on survey response rates (Kristal et al., 1993; Harlow, Crea, East, Oleson, Fraer, & Cramer, 1993; Pottick, 1991). In a recent study conducted by Morrison and colleagues (1997), a multi-staged approach using telephone calls, incentives and second mailings of health surveys resulted in a 92% follow-up of the original cohort over a 2-year period. The military also has investigated strategies that enhance survey response rates. For example, in a study of adverse reproductive outcomes among Gulf War veterans, strategies to increase response rates to self-administered surveys included use of scannable surveys, prenotification letters, reminder postcards, metered and certified mail, business reply envelopes, completion deadline, and repeated mailings (Kamens, Hiliopoulos, Morn, Zau, Anderson, Major, Calderon, & Gray, 1997).

Although every reasonable effort should be made to increase response rates, it is imperative to weigh the costs of these efforts against the potential benefits. The costs incurred by mailing reminder postcards are minimal compared to the benefit of increased returned surveys; however, the costs associated with sending out a complete second mailing of a survey, reply envelope, and introductory letter are much greater and may not increase the response rate significantly (Perneger, Etter, & Rougemont, 1993). Providing a monetary incentive clearly increases costs; however, monetary incentives appear to be the most likely to prompt a return and may be well worth the additional costs. A study conducted by James (1992) examined whether large monetary incentives can significantly increase response rates. Their findings indicated that the response rate increased as the incentive amount increased.

The purpose of this study was to examine the effectiveness of a stepped approach for increasing response rates to a follow-up smoking survey among newly enlisted women in the US

Navy. The effect of this layered approach on response rates and on the characteristics of respondents was evaluated. Demographic and smoking-related characteristics were compared for those responding on-time to the initial mailed follow-up survey, "reluctant" respondents, and nonrespondents. In addition, costs were estimated for each of the steps to determine the relative benefit of such an approach. In general, this population is young, ethnically-diverse, relatively unskilled, mobile, and in some respects considered "high-risk" in terms of health behaviors (Bray, Kroutil, Wheless, Marsden, Bailey, Fairbank, Harford, 1995). Cost-effective strategies that enhance response rates among this group may well work with other at-risk, hard-to-reach populations.

Methods

Participants and Setting

Study participants consisted of volunteers from among all female recruits entering the US Navy between March 1996 and March 1997 (12 consecutive months). These recruits were volunteers for a larger, longitudinal intervention study of smoking cessation/relapse prevention strategies for Navy women during their first year of service (see Conway, Woodruff, Edwards, Elder, Zhu, Hervig, & Hurtado, 1996 for a description of the overall study). Over the course of the year, 5,503 women provided consent and completed machine-scannable baseline surveys at the beginning of basic training—93% of those eligible. Table 1 shows that women recruits were young, with over 90% being less than 24 years of age. The mean age was 19 years ($SD=2.75$). The majority (85%) had a high school education. The recruit sample was ethnically diverse: almost 60% were White/non-Hispanic and Blacks made up a substantial percent of recruits (23%).

Insert Table 1 about here

Procedures for 3-month Follow-up Survey

All female recruits who reported on the baseline survey that they had *any experience with smoking* comprised the cohort of “smokers” who were mailed a scannable follow-up survey three months after leaving basic training. These individuals included those who identified themselves at baseline as daily smokers, occasional smokers, experimenters, or former smokers. The study used several Navy data sources to locate and track “smokers” after basic training for the purpose of conducting the 3-month smoking survey. No fewer than two attempts were made to deliver the 3-month surveys to a valid address.

Steps taken to Increase Response Rates

A number of strategies were used to maximize response to the 3-month survey that included incentives, reminders, and different survey administration procedures. The initial survey was mailed directly to participants and enclosed a stamped return envelope. On the front of the survey, a chance at winning a \$100 lottery prize for returning completed surveys was offered. A winner was randomly chosen once a month, and an insert listing winners’ names accompanied 3-month survey mailings. One week after mailing the survey, a postcard was automatically sent that reminded participants to return their survey and restated the chance to win \$100.

Two weeks after sending the initial mailed survey, trained telephone surveyors attempted to contact nonrespondents at their commands to conduct a slightly shortened version of the survey over the phone. Telephone surveyors continued their attempts to complete the phone

survey for two weeks, and offered participants a chance at winning \$100 for completing the survey over the phone. An additional strategy was used to administer surveys to nonrespondents who were attending Hospital Corps school in Great Lakes, IL. Because a substantial number of recruits attend this school after leaving basic training, because telephone surveys were difficult to conduct at this command, and because an on-site research assistant (RA) was available at Great Lakes, there was an opportunity to administer 3-month surveys face-to-face in small group settings. Research staff would send the RA a list of participants who had not yet completed surveys and who were attending Hospital Corps school. The RA would notify these individuals and arrange to conduct the survey face-to-face in small group settings at Hospital Corps school.

Six weeks after the initial mailed survey had been sent, a brief "postcard" version of the survey with a few critical items was mailed to those who had not yet completed a survey as a final attempt to collect information. Once again, a chance at winning \$100 was offered for completing the "postcard" survey. As a result of these varied efforts, 3-month survey data could have been collected by four different means: (1) initial mailed survey, (2) telephone survey, (4) face-to-face group administration, and (4) brief postcard survey.

Measures

Study participants were categorized into one of 5 response groups: (1) those responding on-time to the initial mailed follow-up survey, (2) those administered the telephone survey, (3) those administered the survey face-to-face, (4) those responding to the brief postcard survey, and (5) nonrespondents. Those responding to the telephone, face-to-face, or brief postcard surveys were considered "reluctant" respondents.

Response groups were compared on a variety of demographic and smoking variables measured at baseline upon entry into basic training. Demographic characteristics included *age*,

race/ethnicity, and education. Baseline smoking variables, most of which were set within the timeframe “prior to recruit training,” included past-month *smoking prevalence* (yes versus no), and *type of smoker* (experimenter, occasional, daily, or former). Several measures of baseline nicotine dependence including *age one first started smoking regularly, number of cigarettes smoked on a typical day, and how soon after waking one usually had her first cigarette.* *Intentions to smoke* after leaving basic training and the extent to which “*you see yourself as someone who smokes a year from now*” were measured on a scale ranging from 1 (definitely no) to 4 (definitely yes). Cessation history was measured by three variables that addressed *ever having tried to quit* (yes versus no), *duration of last quit attempt in days*, and *number of times one's tried to quit in the 12 months* prior to basic training.

Results

Those recruits reporting any experience with smoking at entry to recruit training were sent a 3-month follow-up survey. Approximately 39% (n=1,072) of those still thought to be in the Navy and eligible for follow-up (n=2,783) completed the survey by one of the four administration modes. Table 2 presents the response rates and costs associated with the stepped approach. About 17% returned the initial mailed survey, a response rate comparable to those (11%-17%) reported for one-time opinion surveys sent to lower-ranking Navy enlisted personnel (Kantor, Ford, & Heron, 1996; Kantor, Ford, & Olmstead, 1997). Other administration strategies and versions of the survey were useful in capturing an additional 22% of participants, with the telephone being particularly effective (13.7%).

Insert Table 2 about here

Table 3 presents response group comparisons on demographic and baseline smoking variables. Results of chi-square analysis and one-way ANOVAs showed that the five groups did not differ significantly with regard to age, race/ethnicity, measures of nicotine dependence, intentions to smoke, or cessation history. Significant group differences were found only for education, type of smoker, smoking prevalence, and whether one sees herself as a smoker in a year. Further analyses were conducted on these variables to determine which response groups differed from one another. Analyses showed that respondents to the initial mailed survey did not differ from "reluctant" respondents on these variables. However, when respondents to any form of the survey were combined and compared to nonrespondents, analysis showed statistically significant differences. Compared to respondents, nonrespondents had less education ($\chi^2 = 14.12$, df=2, $p \leq .001$), had a higher smoking rate at entry to basic training ($\chi^2 = 7.49$, df=1, $p \leq .01$), were more likely to be daily smokers ($\chi^2 = 12.69$, df=4, $p \leq .01$), and were more likely to see themselves as a smoker in the future ($t(2770) = 3.75$, $p \leq .001$).

Insert Table 3 about here

Costs Associated with Response Enhancement Steps

In assessing the costs associated with different survey administration methods, we did not include one-time costs (e.g., graphics production) or routine on-going efforts (e.g., staff time

for production of mailing labels; data processing). To calculate the costs of the *initial survey* mailing to all eligible follow-up participants, we included postage and cost of survey printing, reminder postcards, and inserts. Additional costs associated with enhancement steps were then calculated and included surveyor time, additional printing, and postage. These additional costs were based upon the number of participants targeted to receive each mailing.

Table 2 presents the cost for the initial survey and each step taken to increase the response rate. An initial mailed survey cost \$1.21. It cost an additional \$2.30 per targeted participant to conduct the survey by telephone, and this method increased the response rate by 13.7 percentage points. Face-to-face administration of the survey was costly relative to other methods, with an additional cost of \$5.00 per targeted respondent. The final survey strategy, the brief postcard survey, cost an additional \$.75 per targeted respondent and increased the response rate by another 5.9 percentage points.

Conclusions

Results showed that steps taken in the present study to increase survey response rates among Navy enlisted women were successful. Had no telephone, face-to-face, or postcard surveys been administered, response rates would have been as low (17%) as that typically seen in other Navy personnel surveys. Telephone calls in particular appeared to be useful. Although they were almost twice as costly to conduct as the initial mailed survey, they increased the response rate by about 14 percentage points. Face-to-face surveys were by far the most expensive and this strategy is probably not feasible in most survey research studies.

Analysis showed that the characteristics of those who responded to various forms of the survey did not differ significantly in terms of demographic characteristics or baseline smoking levels. This finding was somewhat surprising, since difficult-to-reach or "reluctant

respondents" might be expected to differ from those who responded promptly to the initial mailed survey (Cottler, Zipp, Robins, & Spitznagel, 1987). However, another recent study of limited-English proficient Latino study participants found on-time and reluctant respondents to be similar in terms of demographics and nutrition-related risk factors, although noncompliers were found to be at greater "risk" than on-time and reluctant compliers (Frack, Woodruff, Candelaria, & Elder, 1997). This finding may be encouraging for those who are able only to conduct a one-time mailed survey, in that prompt respondents might provide accurate, representative information and estimates, even without data from those "captured" by more expensive follow-on strategies.

On the other hand, present results showed that those who did not respond at all were different from those responding to some form of the survey in ways documented in other studies. Noncompliers in longitudinal survey studies are often found to be at greater "risk" demographically (e.g., lower education) and in terms of their health attitudes, behavior, and status than those who comply (Frack, Woodruff, Candelaria, & Elder, 1997; Biglan, Hood, Brozovsky, Ochs, Ary & Black, 1991; Slymen, Drew, Wright, Elder, & Williams, 1992; Given, Keilman, Collins, & Given, 1990; Hansen, Collins, Malotte, Johnson, & Fielding, 1985; Kramer, Jeffery & Snell, 1986; Marmor, Oliveria, Donahue, Garrahie, White, Moore, & Ellison, 1991; Cottler et al., 1987).

These results will be useful for those conducting surveys to describe and evaluate Navy programs. There are approximately 500,000 enlisted personnel in the Navy alone. The military is downsizing and is concerned about decrements in readiness and morale. Mailed surveys are playing an increasing role in monitoring personnel issues, attitudes, health, job-related factors, and quality of life. Results are not limited, however, to young enlisted Navy personnel. Results

seen here could well apply to survey efforts with other hard-to-reach populations, including the young, multi-ethnic, relatively unskilled, at-risk, and lower socioeconomic groups.

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Table 1

Sociodemographic Characteristics of Women Entering the U.S. Navy Over a One-year Period

Sociodemographic Characteristic	%	n
Age		
17-18 years	41.1	2,253
19-23	50.4	2,761
24 or more years	8.5	465
Missing		24
Education		
Less than high school	5.5	302
High school	85.1	4,666
More than high school	9.4	513
Missing		22
Race/ethnicity		
White, non-Hispanic	57.9	3,169
Black	23.3	1,273
Hispanic	12.2	670
Asian/Pacific Islander	4.2	228
Native American	2.4	130
Missing		33

Table 2
 Response Rates and Costs Associated with Stepped Approach to Increasing
 Survey Response Rates

Survey Administration Mode	Number completing survey	Response rate (% of targeted)	Additional cost per targeted respondent	Total cost per targeted respondent
Initial Mailed Survey	469	16.9	--	\$1.21
Telephone Survey	382	13.7	\$2.30	\$3.51
Face-to-Face Survey	57	2.0	\$5.00	\$8.51
Postcard Survey	164	5.9	\$.75	\$9.26
Total Respondents	1,072	38.5	--	\$4.21*

* Weighted average of cost per targeted respondent

Table 3

Comparison of Respondents, Reluctant Respondents, and Nonrespondents to a Smoking Survey for Newly Enlisted Navy Women

Baseline Characteristic	% Mean or Median				χ^2 or F	
	Respondents to Initial Mailed Survey	Reluctant Respondents		Nonrespondents		
		Phone Survey	Face-to- Face Survey			
Age (mean)	19.8	19.5	19.3	19.9	19.8	1.8
Race/ethnicity (%)						
White, non-Hispanic	70.9	75.5	68.4	68.1	70.3	
Black	10.9	8.2	8.8	9.8	11.9	
Hispanic	13.0	10.0	12.3	13.5	12.4	
Asian/Pacific Islander	3.6	2.6	7.0	4.9	3.4	
Native American	1.7	3.7	3.5	3.7	2.1	9.4
Education (%)						
< high school	4.7	4.7	1.8	3.7	7.4	
High school	84.9	86.4	93.0	86.5	85.4	
> high school	10.4	8.9	5.3	9.8	7.2	17.4*
Past-month smoking (%)	71.4	77.0	62.5	74.4	78.0	15.2*
Type of smoker (%)						
Experimenter	26.4	19.6	26.3	24.4	19.5	
Occasional	20.0	25.9	22.8	21.3	20.8	
Daily	45.7	49.5	42.1	49.4	54.1	
Former	7.4	5.0	8.8	4.9	5.5	25.4*
Age first started smoking fairly regularly (mean)	15.7	15.8	15.5	15.8	15.8	0.4
Cigarettes smoked per day (median range)	6-10	6-10	6-10	6-10	6-10	1.4
Min. after waking have first cigarette (median range)	31-60	31-60	31-60	31-60	31-60	1.1
Intentions to smoke (mean)	2.0	2.1	1.9	2.0	2.1	1.8
See oneself as a smoker in 1 year (mean)	1.8	1.9	1.9	1.9	2.0	3.7*
Ever tried to quit (%)	68.1	69.6	68.1	68.1	62.8	8.8
Duration of last quit attempt in days (median range)	8-29	8-29	8-29	8-29	8-29	1.1
Number of times quit in prior 12 months (mean)	1.8	1.7	1.6	1.8	1.5	1.9

* p ≤ .05

Grant No. DAMD17-95-1-5075

Appendix B

Abstract 1998 APHA

**Abstract Submission Form
126th Annual Meeting
Theme: "Public Health and Managed Care"
Washington, DC—November 15–19, 1998**

DEADLINE: Received on or before February 10, 1998

FOR PROGRAM PLANNER USE	
Session:	_____
Day:	_____
Time: From _____	To _____
Abstract:	
<input type="checkbox"/> Contributed <input type="checkbox"/> Solicited	

Operation Stay Quit: A Mail Intervention to Prevent Smoking Relapse Among Navy Women Recruits

Christine C. Edwards, M.P.H., Susan L. Woodruff, Ph.D.(cand.), Terry L. Conway, Ph.D.

Studies indicate that U.S. Navy women are more likely to smoke than their civilian counterparts, with smoking rates reported as high as 35-50%. For all new recruits, smoking is strictly prohibited 24 hours a day for the eight-week period of recruit training. While it is tempting to believe that these women recruits have successfully passed a critical period for smoking cessation, as many as 67% of recruits immediately return to smoking upon graduating from recruit training. Operation Stay Quit designed a mailed materials intervention for these women to provide motivational and behavioral cues at critical relapse points following recruit training. The intervention was conducted over a 12-month period, with more frequent contact during the first 4 months when relapse was most likely to occur. Participants' smoking status at 6 months post-RTC graduation was assessed through a self-report, written survey. Preliminary results of the 6-month follow-up survey indicate that women in the mailed materials condition were more likely to have quit, made more quit attempts, and reported less nicotine dependence than those in the control condition, although differences were not statistically significant. A 12-month follow-up survey is planned.

DISCLOSURE:

Educational Objectives (type single-space, 50 words or less): At the conclusion of the presentation, the participant should be able to (e.g., demonstrate, recognize, analyze, identify)....

To identify effective strategies for preventing smoking relapse among young women.

Continuing Professional Education
I would like the session during which this abstract will be presented to be eligible for CPE contact hours:
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, in which discipline(s):
<input type="checkbox"/> Physicians
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<input type="checkbox"/> Certified Health Education Specialists
<input type="checkbox"/> Registered Dietitians
<input type="checkbox"/> Dentists/Dental Professionals
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Preferred format for presentation:
<input type="checkbox"/> Verbal presentation
<input checked="" type="checkbox"/> Poster
<input type="checkbox"/> Roundtable
<input type="checkbox"/> No preference
Abstract submitted to the following ONE Section/SPIG/Caucus
A TOD

Key Words (2): smoking relapse

Checklist for Abstract Submission Material (*Have you completed and included the following in your packet?*)

- 9 copies of the Abstract Submission Form (5 copies with authors' names included, and 4 copies without authors' names or any reference to their organization/institution in the title or body of the abstract)
 - Does your Abstract Submission Form include:
 - Educational Objectives
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 - Key Words
- Presenter Identification Form
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